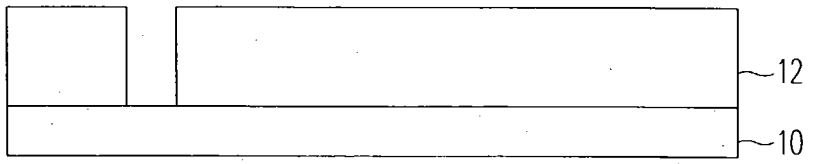


FIG. 1A
(Conventional)

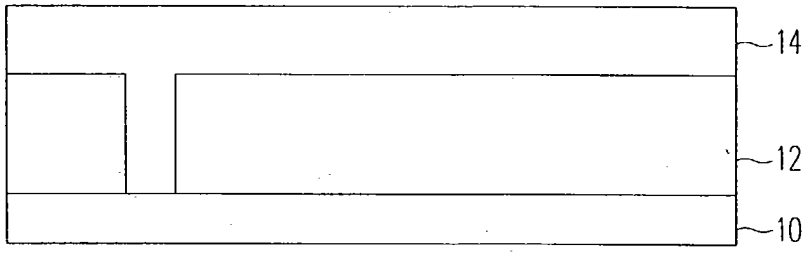


FIG. 1B
(Conventional)

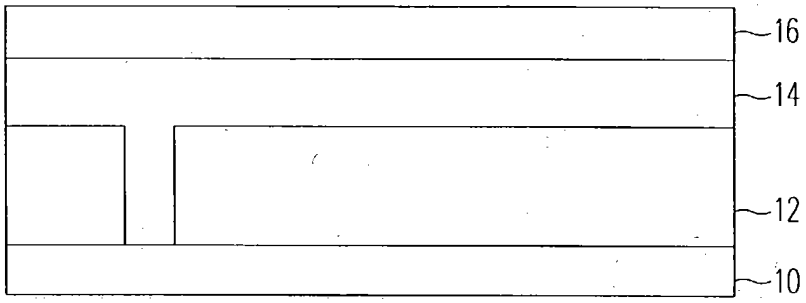


FIG. 1C
(Conventional)

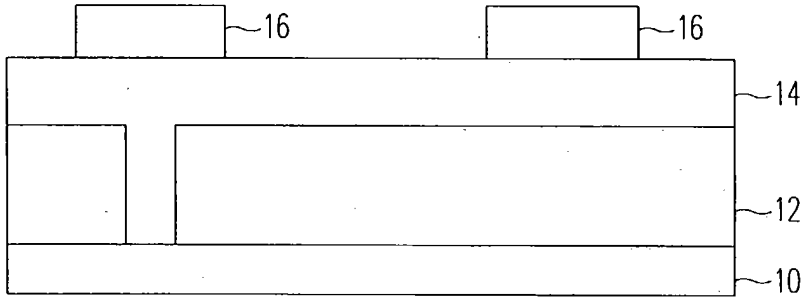


FIG. 1D
(Conventional)

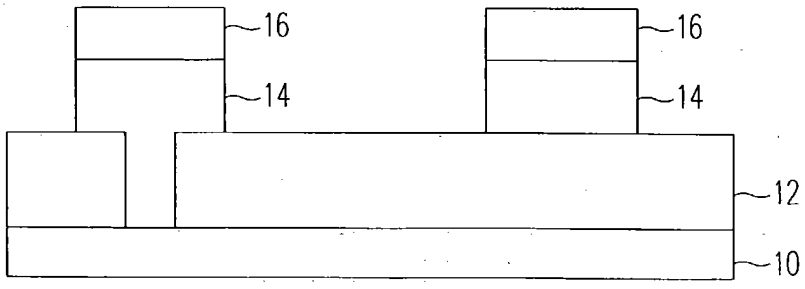


FIG. 1E
(Conventional)

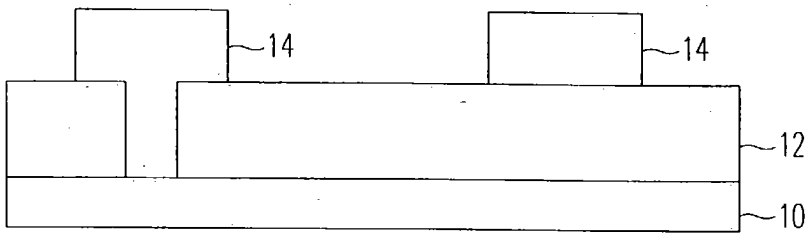


FIG. 1F
(Conventional)

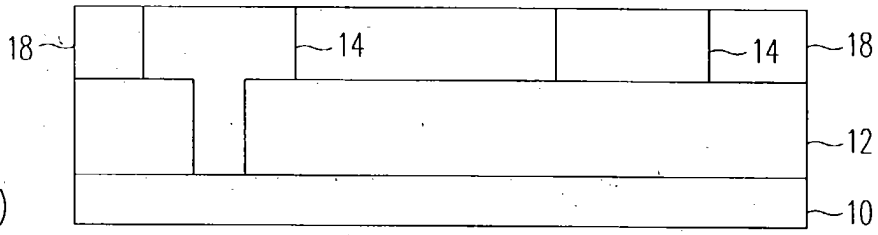


FIG. 1G
(Conventional)

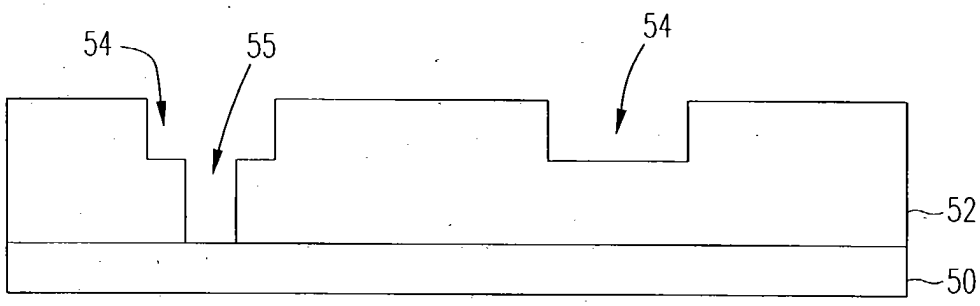


FIG. 2A
(Conventional)

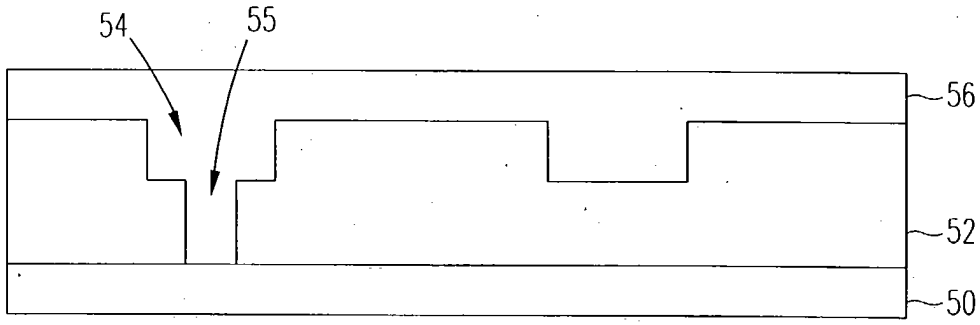


FIG. 2B
(Conventional)

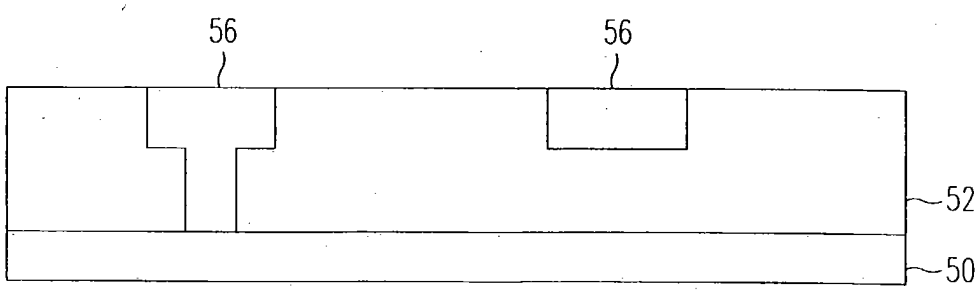


FIG. 2C
(Conventional)

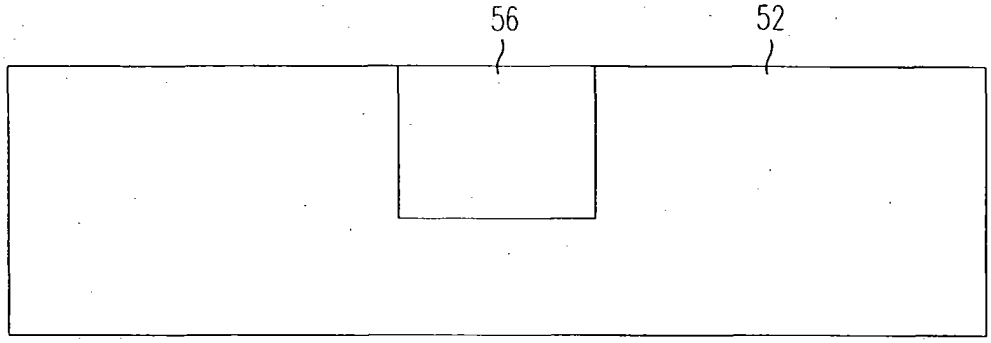


FIG. 3
(Conventional)

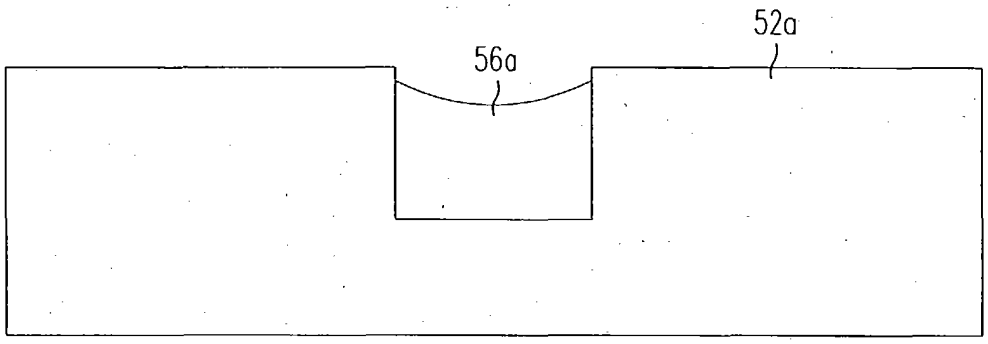


FIG. 4
(Conventional)

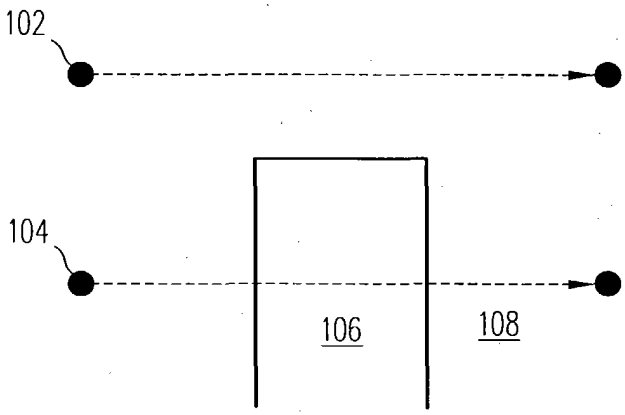


FIG. 5

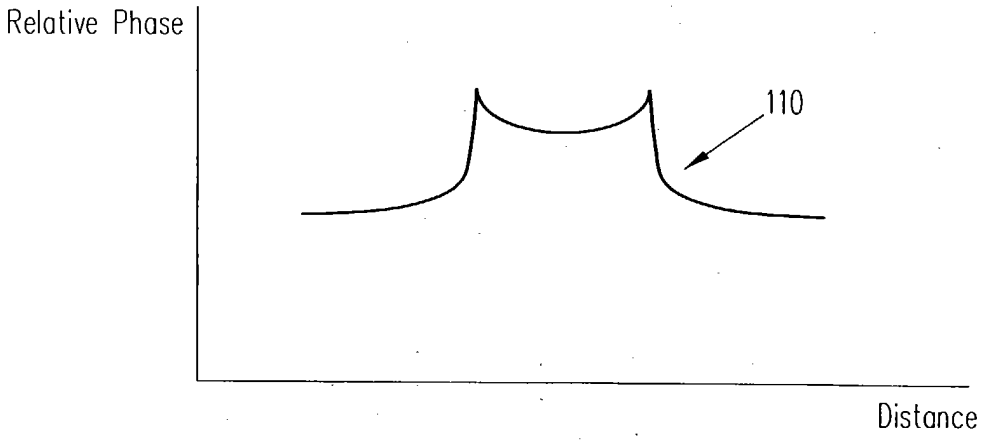


FIG. 6

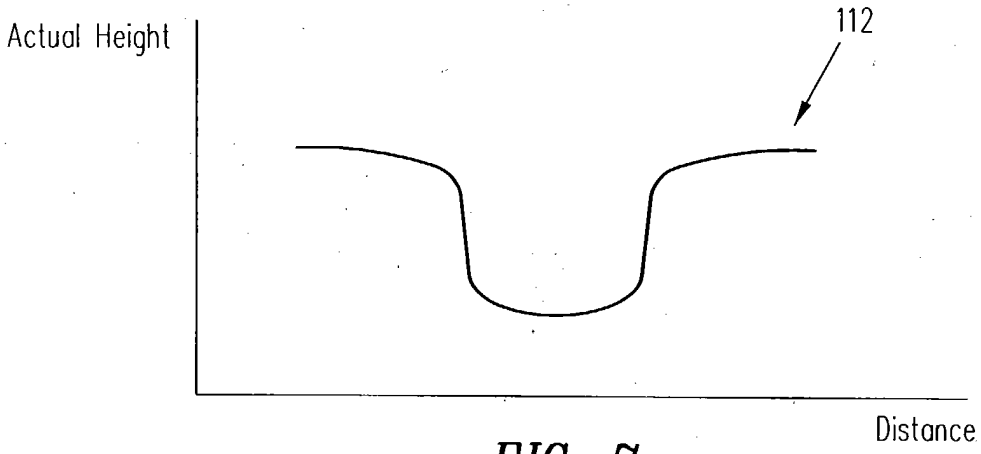


FIG. 7

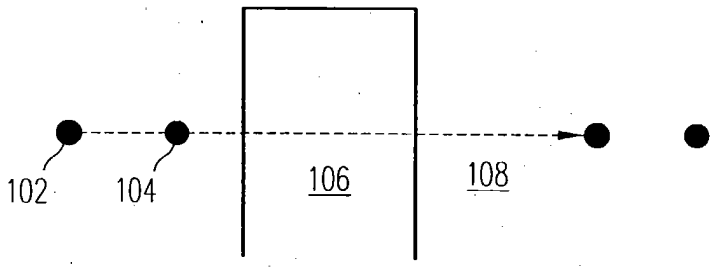


FIG. 8

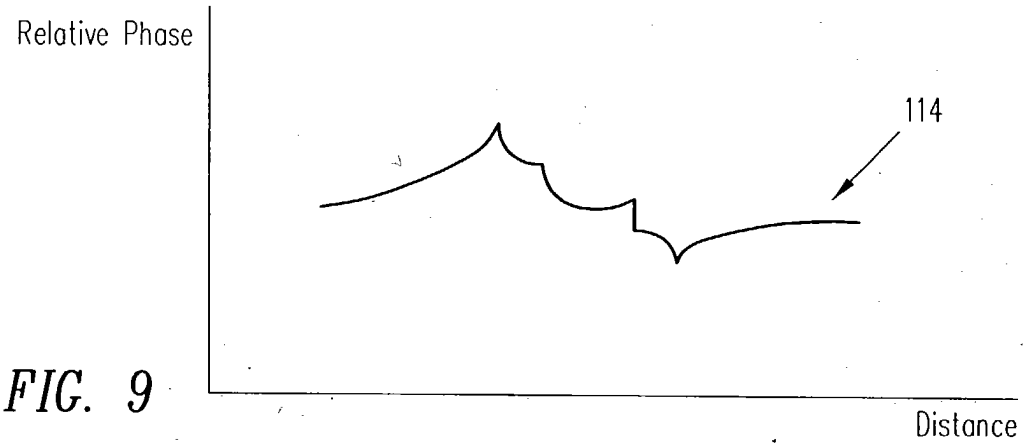


FIG. 9

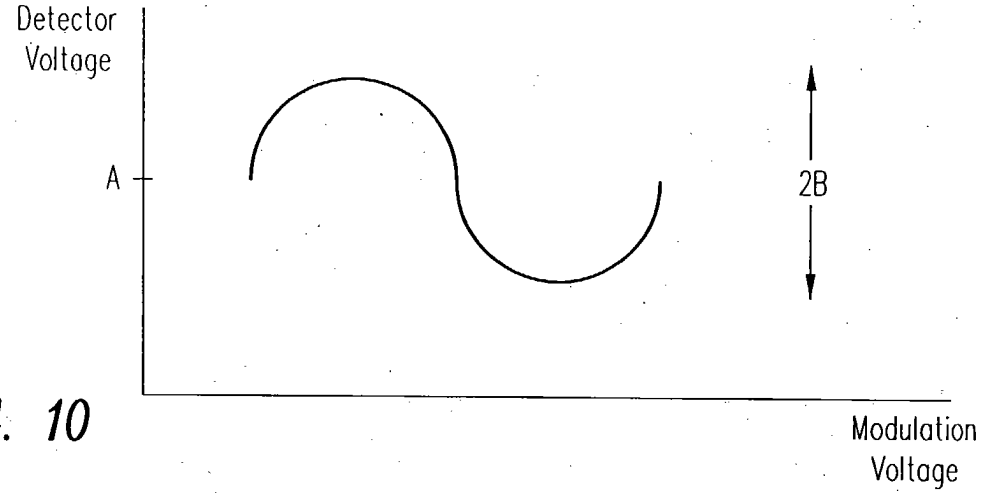


FIG. 10

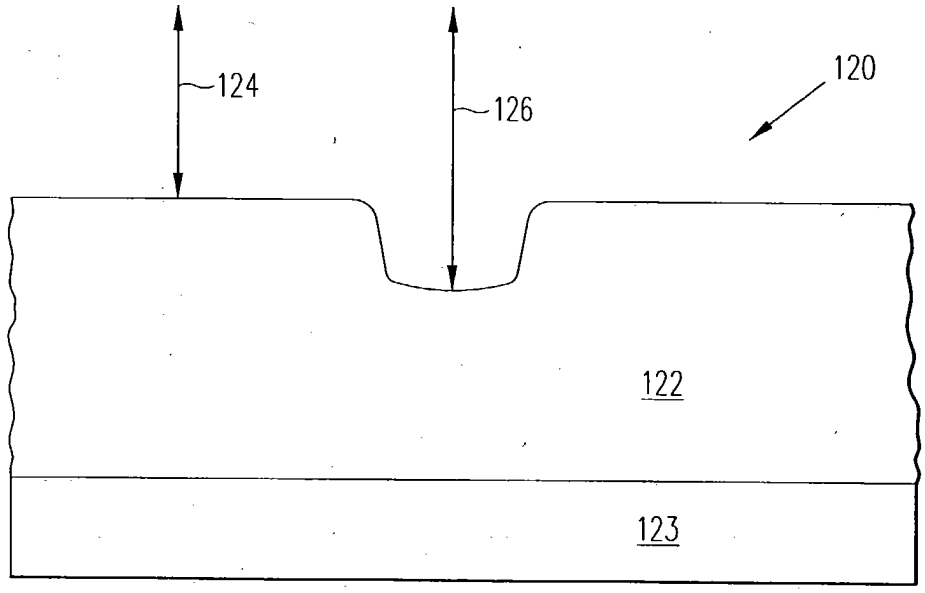


FIG. 11

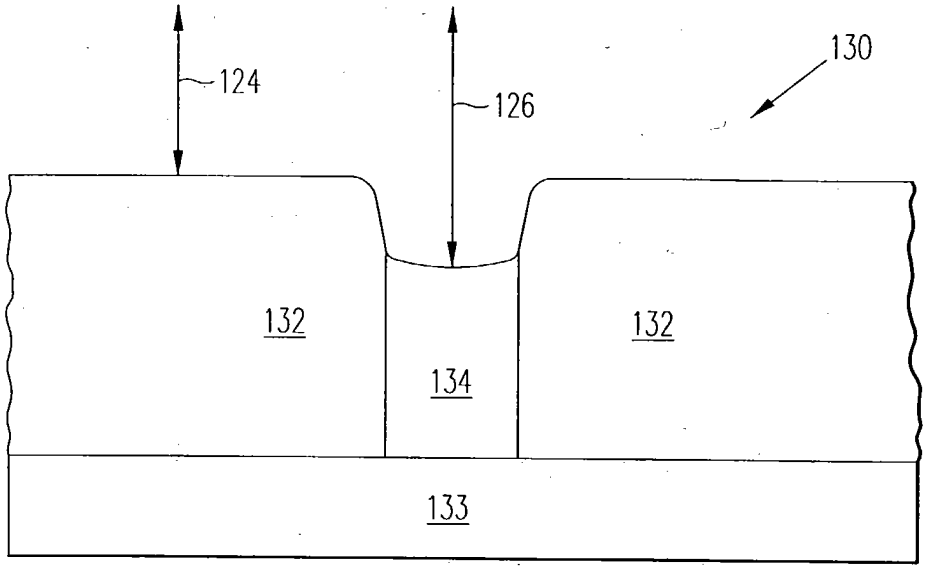


FIG. 12

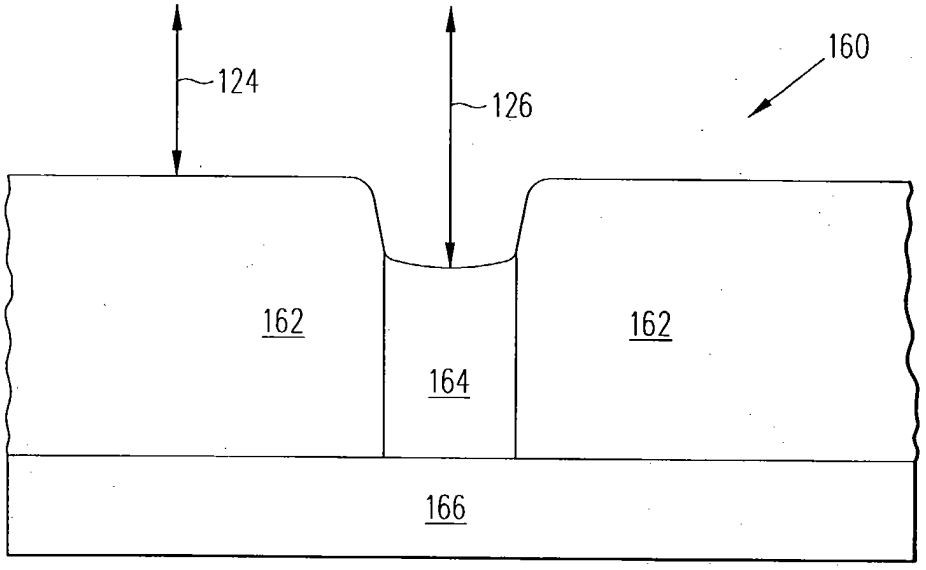


FIG. 15

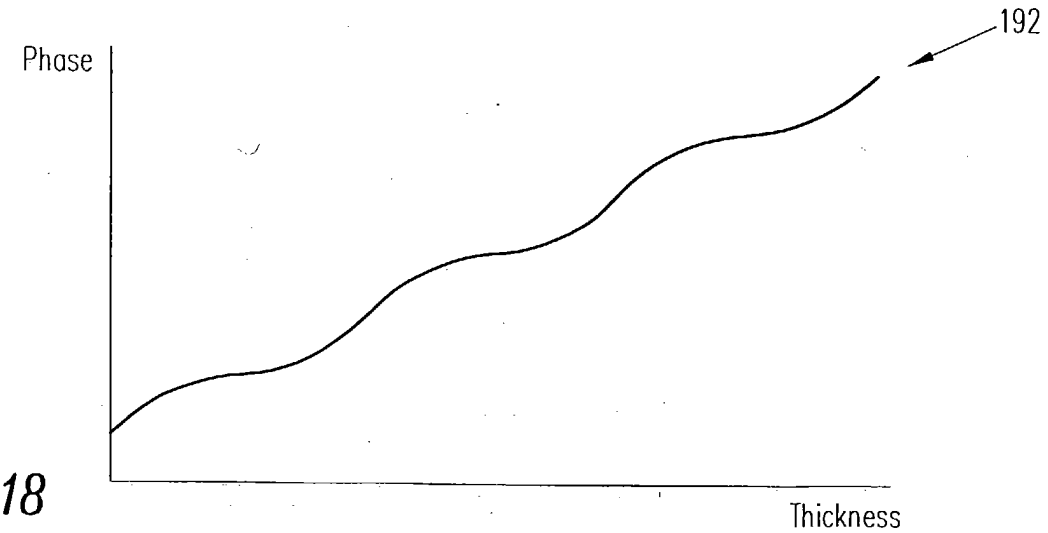


FIG. 18

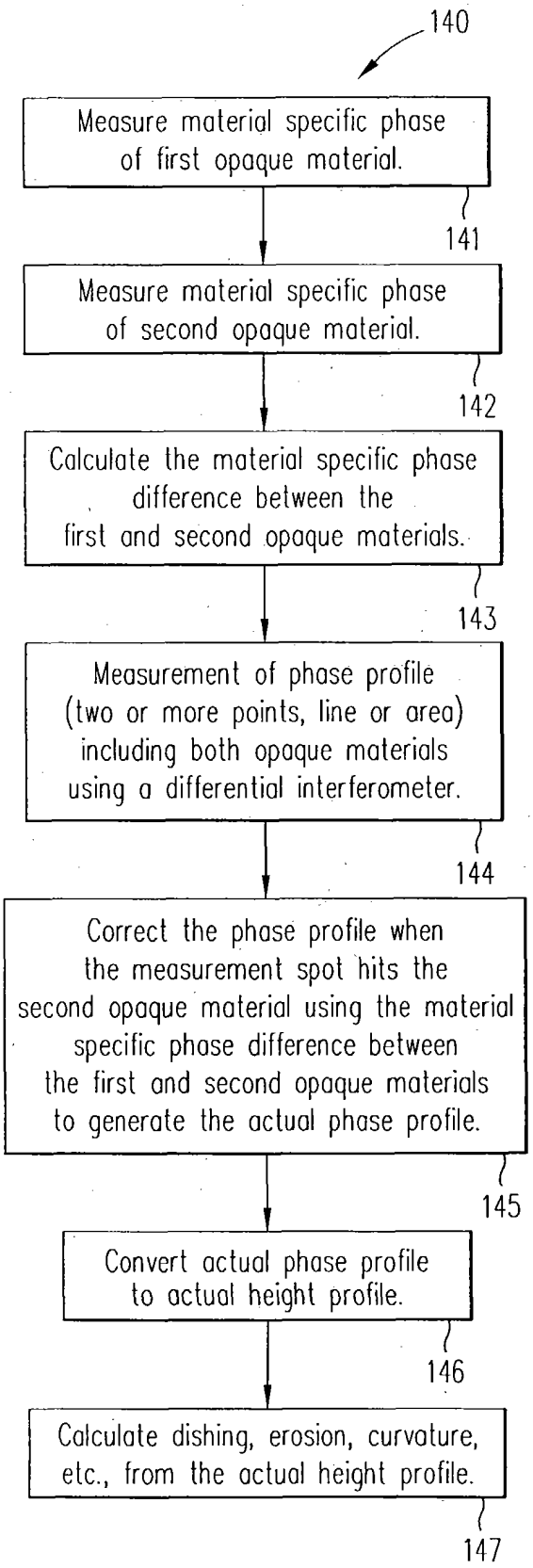

140
Measure material specific phase of first opaque material.
141
Measure material specific phase of second opaque material.
142
Calculate the material specific phase difference between the first and second opaque materials.
143
Measurement of phase profile (two or more points, line or area) including both opaque materials using a differential interferometer.
144
Correct the phase profile when the measurement spot hits the second opaque material using the material specific phase difference between the first and second opaque materials to generate the actual phase profile.
145
Convert actual phase profile to actual height profile.
146
Calculate dishing, erosion, curvature, etc., from the actual height profile.
147

FIG. 13

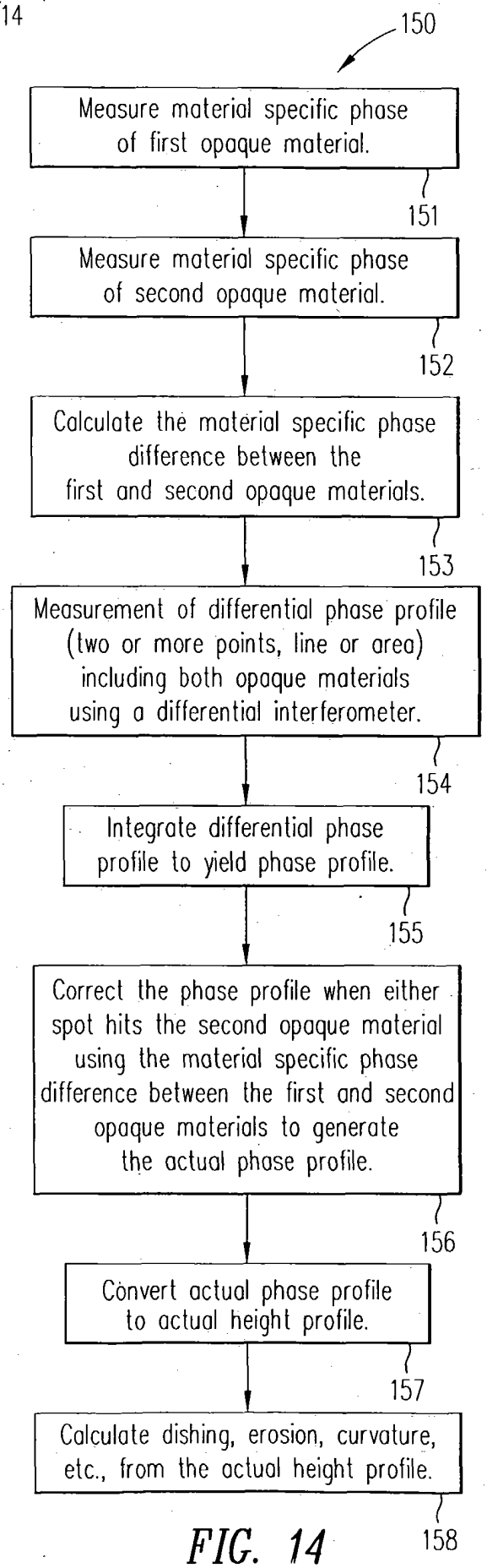

150
Measure material specific phase of first opaque material.
151
Measure material specific phase of second opaque material.
152
Calculate the material specific phase difference between the first and second opaque materials.
153
Measurement of differential phase profile (two or more points, line or area) including both opaque materials using a differential interferometer.
154
Integrate differential phase profile to yield phase profile.
155
Correct the phase profile when either spot hits the second opaque material using the material specific phase difference between the first and second opaque materials to generate the actual phase profile.
156
Convert actual phase profile to actual height profile.
157
Calculate dishing, erosion, curvature, etc., from the actual height profile.
158

FIG. 14

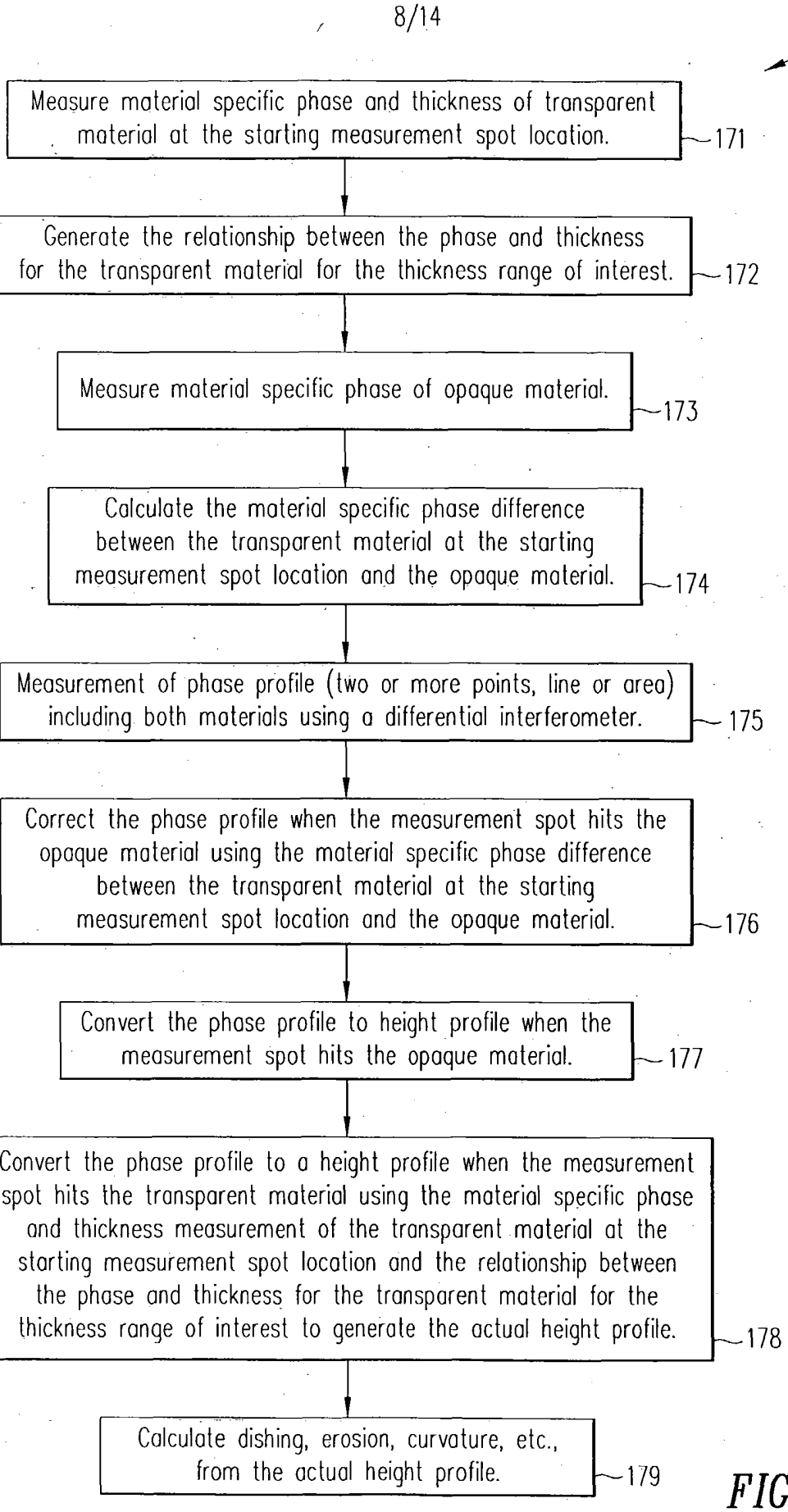

170
Measure material specific phase and thickness of transparent material at the starting measurement spot location.
171
Generate the relationship between the phase and thickness for the transparent material for the thickness range of interest.
172
Measure material specific phase of opaque material.
173
Calculate the material specific phase difference between the transparent material at the starting measurement spot location and the opaque material.
174
Measurement of phase profile (two or more points, line or area) including both materials using a differential interferometer.
175
Correct the phase profile when the measurement spot hits the opaque material using the material specific phase difference between the transparent material at the starting measurement spot location and the opaque material.
176
Convert the phase profile to height profile when the measurement spot hits the opaque material.
177
Convert the phase profile to a height profile when the measurement spot hits the transparent material using the material specific phase and thickness measurement of the transparent material at the starting measurement spot location and the relationship between the phase and thickness for the transparent material for the thickness range of interest to generate the actual height profile.
178
Calculate dishing, erosion, curvature, etc., from the actual height profile.
179

FIG. 16

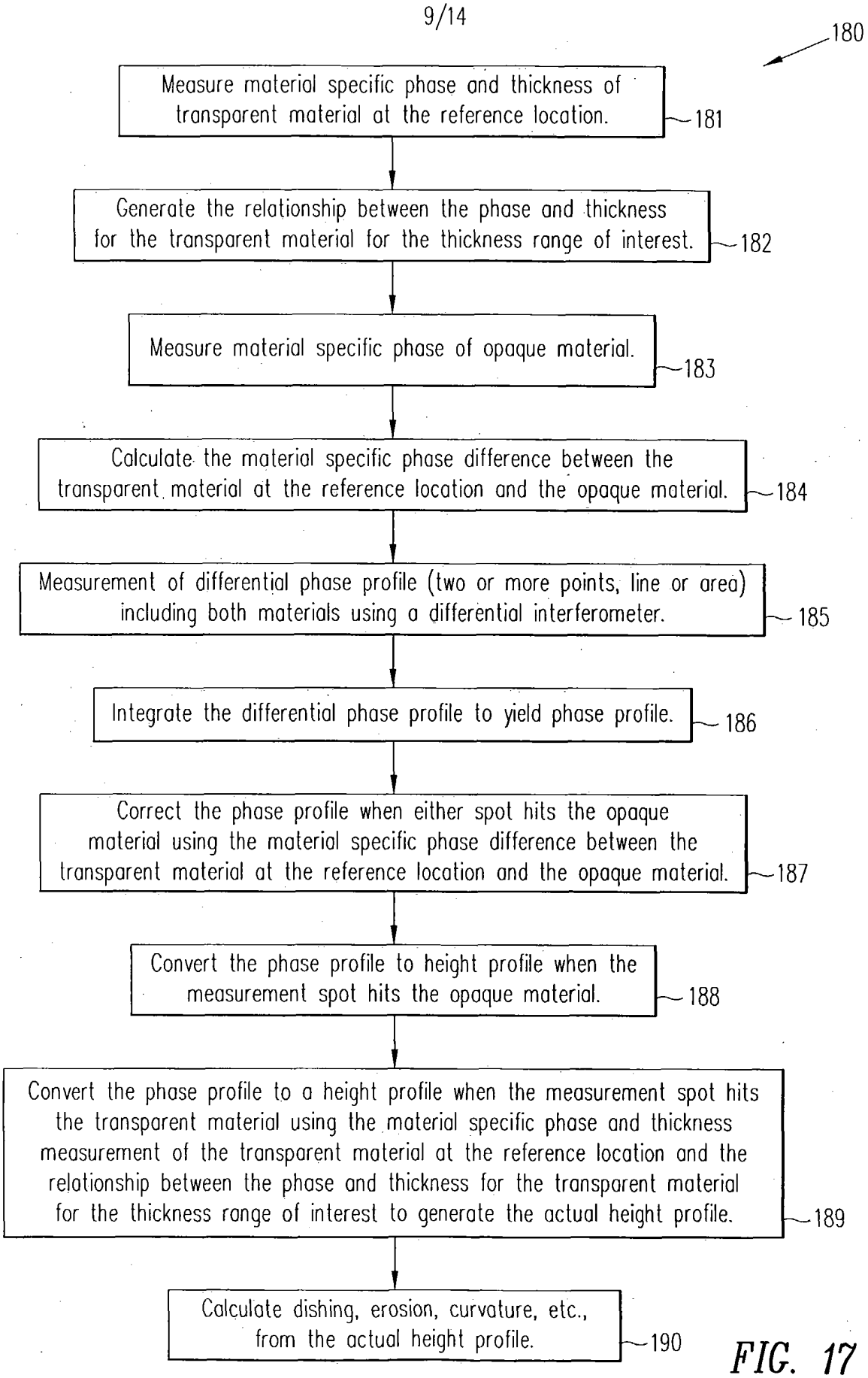

180
Measure material specific phase and thickness of transparent material at the reference location.
181
Generate the relationship between the phase and thickness for the transparent material for the thickness range of interest.
182
Measure material specific phase of opaque material.
183
Calculate the material specific phase difference between the transparent material at the reference location and the opaque material.
184
Measurement of differential phase profile (two or more points, line or area) including both materials using a differential interferometer.
185
Integrate the differential phase profile to yield phase profile.
186
Correct the phase profile when either spot hits the opaque material using the material specific phase difference between the transparent material at the reference location and the opaque material.
187
Convert the phase profile to height profile when the measurement spot hits the opaque material.
188
Convert the phase profile to a height profile when the measurement spot hits the transparent material using the material specific phase and thickness measurement of the transparent material at the reference location and the relationship between the phase and thickness for the transparent material for the thickness range of interest to generate the actual height profile.
189
Calculate dishing, erosion, curvature, etc., from the actual height profile.
190

FIG. 17

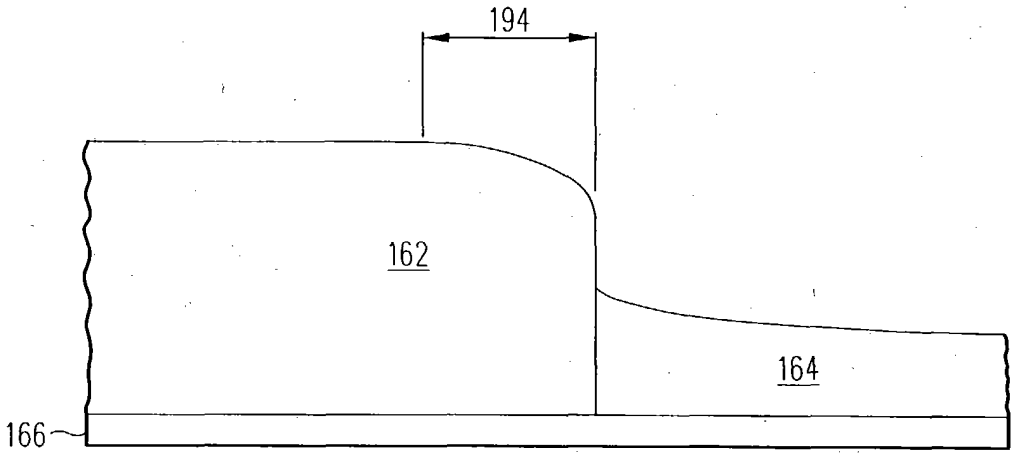


FIG. 19

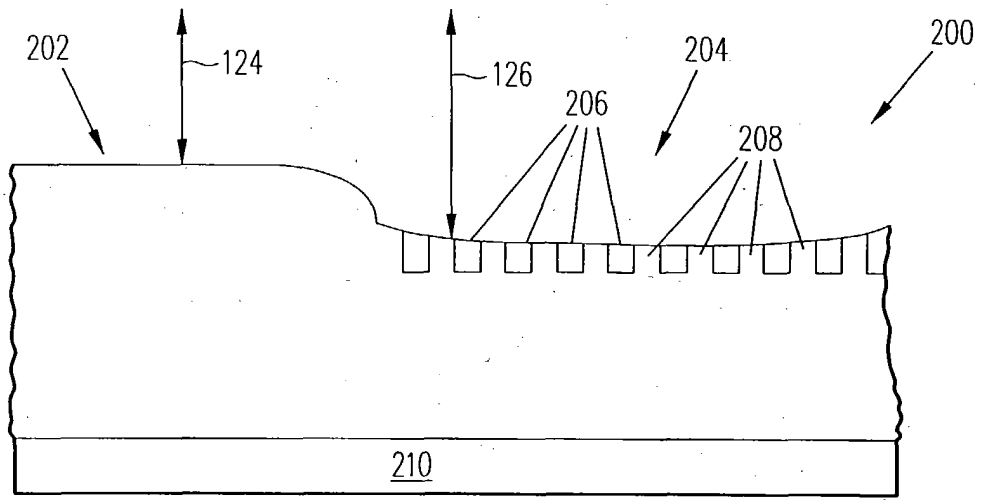


FIG. 20

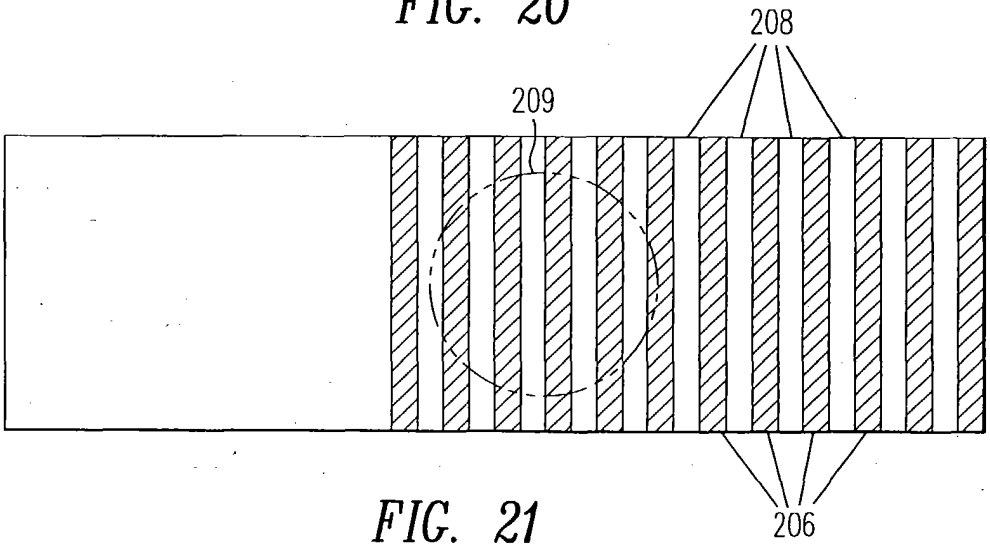


FIG. 21

FIG. 22A

FIG. 22B

Key To

FIG. 22

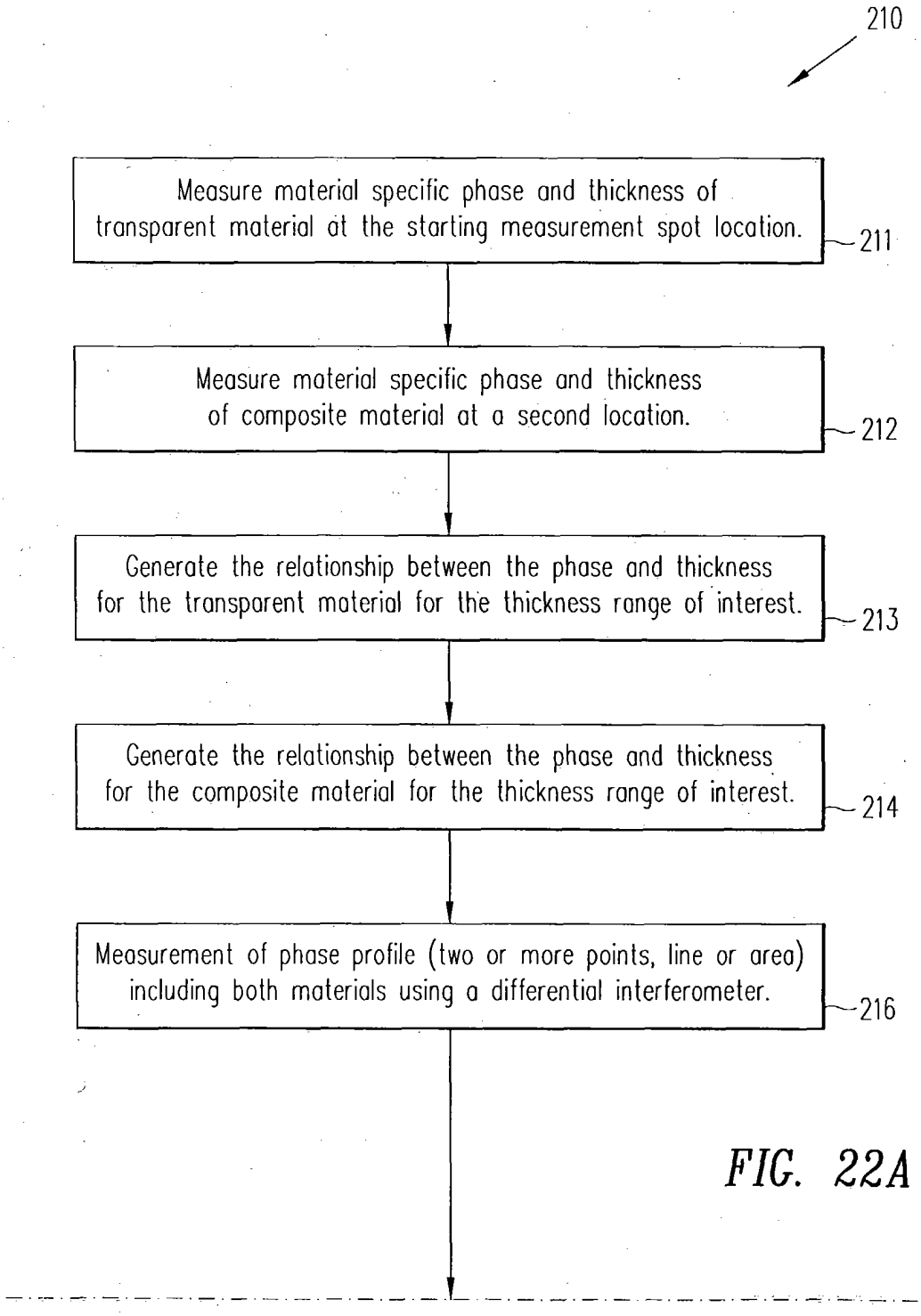


FIG. 22A

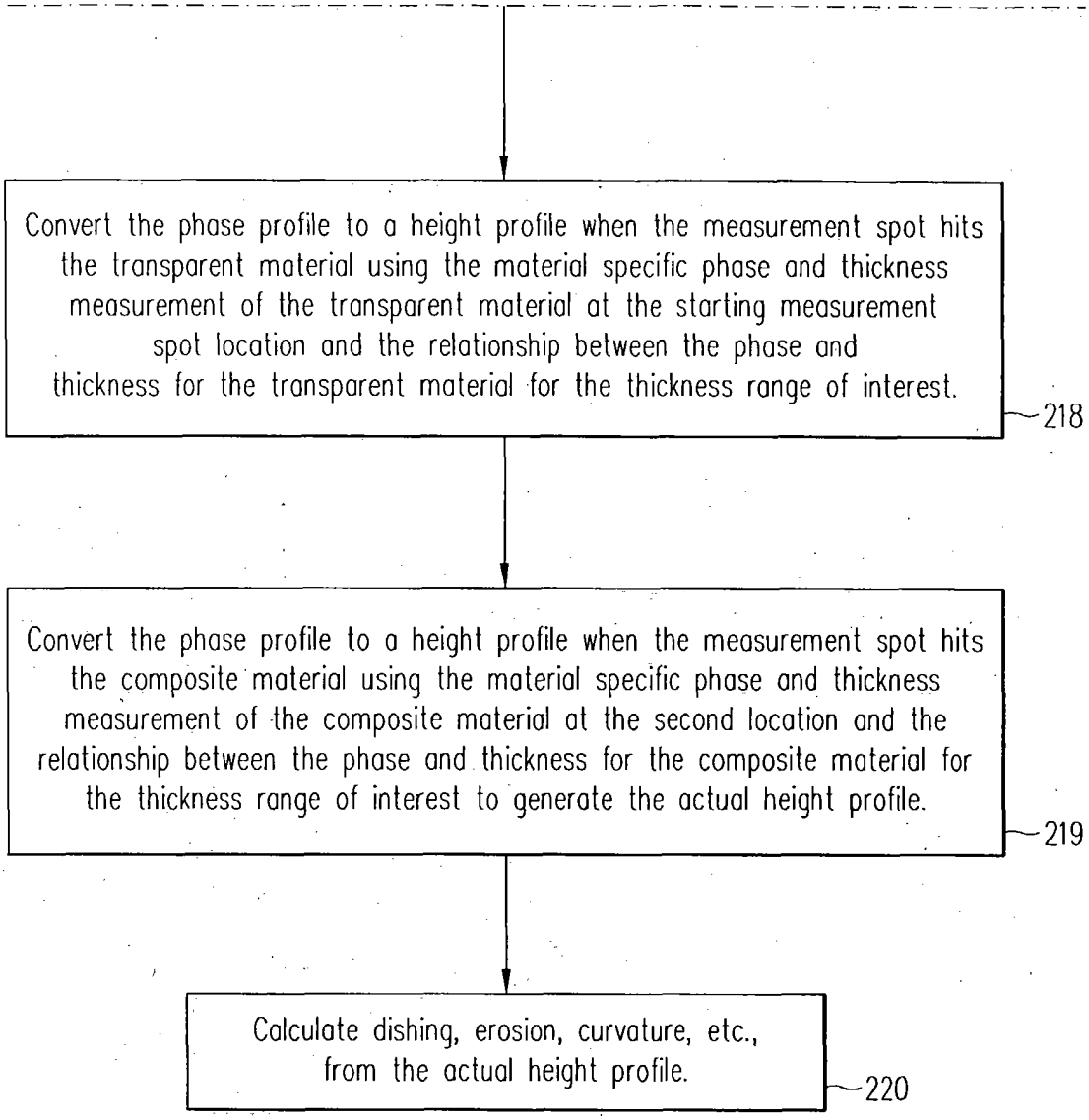
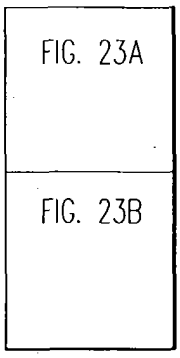

Convert the phase profile to a height profile when the measurement spot hits the transparent material using the material specific phase and thickness measurement of the transparent material at the starting measurement spot location and the relationship between the phase and thickness for the transparent material for the thickness range of interest.
218
Convert the phase profile to a height profile when the measurement spot hits the composite material using the material specific phase and thickness measurement of the composite material at the second location and the relationship between the phase and thickness for the composite material for the thickness range of interest to generate the actual height profile.
219
Calculate dishing, erosion, curvature, etc., from the actual height profile.
220

FIG. 22B



Key To
FIG. 23

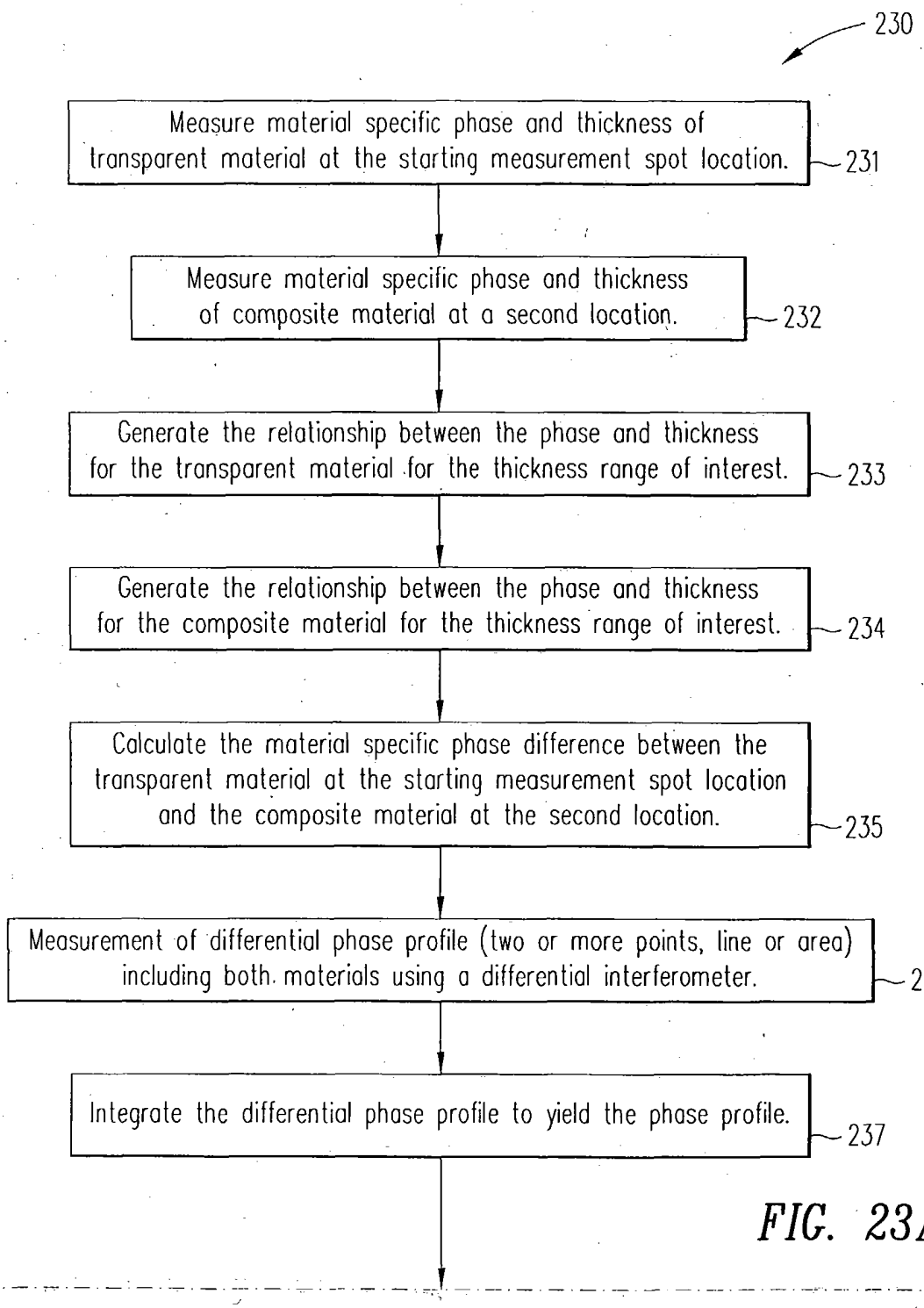


FIG. 23A

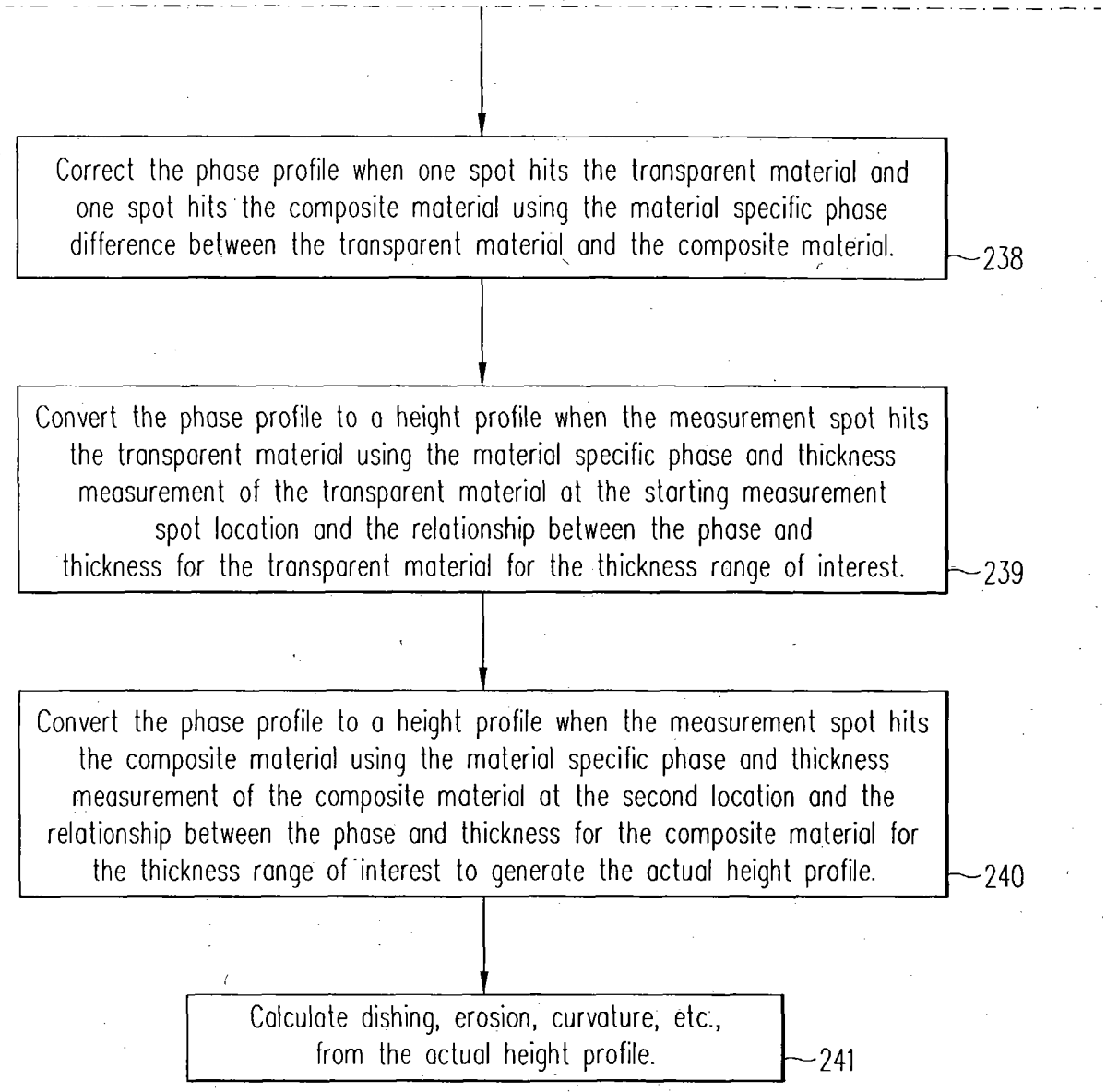

Correct the phase profile when one spot hits the transparent material and one spot hits the composite material using the material specific phase difference between the transparent material and the composite material.
238
Convert the phase profile to a height profile when the measurement spot hits the transparent material using the material specific phase and thickness measurement of the transparent material at the starting measurement spot location and the relationship between the phase and thickness for the transparent material for the thickness range of interest.
239
Convert the phase profile to a height profile when the measurement spot hits the composite material using the material specific phase and thickness measurement of the composite material at the second location and the relationship between the phase and thickness for the composite material for the thickness range of interest to generate the actual height profile.
240
Calculate dishing, erosion, curvature, etc., from the actual height profile.
241

FIG. 23B